

REMARKS

Claim 1 has been amended to employ consistent language through the claim. No new matter has been added by this change.

The Examiner's rejection of claims 1-5 under 35 USC § 103(a) as being obvious over Jeng et al. (US Patent 6,251,177), newly cited, in view of Bulat et al. (US Patent 4,713,358), newly cited, is improper. It is submitted that the Examiner has employed impermissible hindsight, and has applied the teachings of the present invention to the prior art to make out a case of obviousness.

Applicant's invention is the discovery of the criticality of the combination of claimed ranges for the concentration and temperature of the etching solution, and the etching time. Applicant's sworn specification explains that Applicant found "the occurrence of failures [bad silicide formation] was found to be highly dependant on the concentration and temperature of the etching solution, and the etching time." Amendment to Specification, Amendment A, pg. 3. The Examiner's rejection, however, ignores the criticality of the combination, and picks and chooses individual elements from Jeng et al. and Bulat et al. to recreate the Applicant's invention. The primary reference Jeng et al. teaches a maximum relative concentration of 37% hydrochloric acid:30% hydrogen peroxide:water of 1:1:5. Applicant's claimed invention requires a minimum relative concentration of hydrochloric acid:hydrogen peroxide:water of 1:1:5. Moreover, Jeng et al., as the Examiner admits, does not teach using a solution temperature in the ranges of 25 to 50°C. Rather, Jeng et al. teaches using higher temperature for the etching solution. Therefore, the Examiner cites Bulat et al. as teaching the use of a solution temperature of 25°C. However, Bulat et al. does not teach the claimed ranges for the concentration of etching solution or the

HAYES SOLOWAY P.C.
130 W. CUSHING ST.
TUCSON, AZ 85701
TEL. 520.882.7623
FAX. 520.882.7643

175 CANAL STREET
MANCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567

etching time. Indeed, Bulat et al. fails to teach any concentration. The criticality of the combination of the claimed solution temperature and concentration ranges is not taught in either reference. Thus, the Examiner is using hindsight to combine the references and formulate the rejection.

Moreover, there are other distinctions.

The primary reference Jeng et al. forms metal silicide in a single step by exposing a silicon layer which has been heated up to a silicidation temperature with metal flux. On the other hand, the present invention includes a first step of forming a metal (cobalt) on a silicon layer and a second step of silicidizing the metal and the silicon layer.

Since Jeng et al. has as an object to simplify the process (see column 2, lines 64 to 67 of Jeng et al.), Jeng et al. does not give any motivation to a person skilled in this art to divide the single step of forming the metal silicide as above discussed into two steps, i.e., a first step of forming a metal and a second step of silicidizing the metal as required by the present invention.

Further, it is submitted that one skilled in the art would not be motivated to combine Jeng et al. and Bulat et al. as suggested by the Examiner. Jeng et al. teaches forming a metal silicide by exposing a silicon layer which has been heated up to a silicidation temperature with metal flux and then the metal which has attached to portions except for the silicon layer, is removed with an etchant having a predetermined composition.

On the other hand, Bulat et al. teaches a two step method in which after a metal has been formed on a silicon layer, the metal and the silicon layer are both silicidized and then unreacted metal is removed with etchant with a predetermined etchant temperature.

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130 W. CUSHING ST.
TUCSON, AZ 85701
TEL. 520.882.7623
FAX. 520.882.7643

175 CANAL STREET
MANCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567

Further, the method of silicidation as taught in Jeng et al. is completely different from that of Bulat et al.

It must be remembered Jeng et al. has as an object to simplify the silicidation process, and to this end teaches a one step process. Bulat et al., on the other hand teaches a complicated multi-step process.

Having dealt with all the objections raised by the Examiner, the Application is believed to be in order for allowance. Early and favorable action are respectfully requested.

In the event there are any fee deficiencies or additional fees are payable, please charge them (or credit any overpayment) to our Deposit Account Number 08-1391.

Respectfully submitted,



Norman P. Soloway
Attorney for Applicant
Reg. No. 24,315

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HAYES SOLOWAY P.C.
130 W. CUSHING ST.
TUCSON, AZ 85701
TEL. 520.882.7623
FAX. 520.882.7643

175 CANAL STREET
MANCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567